Mammalian Bite Management

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Overview

- Wound Management
- Wound Infections
  - Bacterial
  - Viral
- Surgical Bite Wound Management

Most Common Bites

- USA:
  - Dog
  - Cat
  - Human
- World:
  - Dog
  - Cat
  - Human

-Most Fatalities:

-Big Cats & Bears

B...ls

- Dog
- Cat
- Wolves
- Tigers
- Lions
- Camels
- Hippos

Animal Associated Diseases include:

- Malaria
- Chagas
- Hemorraghic Fevers
- Viral Encephalitis
- Leishmaniasis

Wound Types

- Large Animals:
  - Claws and teeth can puncture cranium
  - Eviscerate
  - Massive soft tissue crush wounds
  - Fracture bone
  - Amputations occur

How would you manage this?

Mammalian Bite Wounds Should be Managed as a Major Trauma per ATLS Guidelines

Bacterial Bite Infections

- Wound Cleansing is Key!
- Options for Wound Repair depends on the type of wound, the animal, wound site, delay in primary cleansing and host factors

Tetanus

	Clean minor wounds		All other wounds[a]	
History of tetanus immunization	**Td**	**TIG**	**Td**	**TIG**
< 3 or uncertain doses	**Yes**	**No**	**Yes**	**Yes**
≥ 3 doses				
Last dose within 5 y	**No**	**No**	**No**	**No**
Last dose within 5–10 y	**No**	**No**	**Yes**	**No**
Last dose >10 y	**Yes**	**No**	**Yes**	**No**

Mammalian Bites

- HIGH RISK
  - **Location**
    - **Hand, wrist, or foot**
    - **Scalp or face in infants (high risk of cranial perforation; skull x-ray mandatory)**
    - **Over a major joint (possible perforation)**
    - **Through-and-through bite of cheek**
  - **Type of wound**
    - **Puncture (difficult to irrigate)**
    - **Tissue crushing that cannot be debrided**

Mammalian Bites

- **LOW RISK:**
  - Location
    - Face, scalp, ears, or mouth
  - Type of wound
    - Large clean lacerations that can be thoroughly

Mammalian Bites

- Patient Factors:
  - Older than 50 years
  - Asplenic
  - Chronic alcoholic
  - Altered immune status
  - Diabetic
  - Peripheral vascular insufficiency
  - Chronic corticosteroid therapy
  - Prosthetic or diseased heart valve or joint

Mammalian Bites

- Species Specific Increased Infection Risk:
- Domestic cat & Large cat (deep punctures)
- Human (hand bites)
- Primates
- Pigs

Mammalian Bite Complications

- Bacterial:
  - Pasteurella
  - E. Corrodens
  - Capnocytophagia camoris
  - Aeromonas Hydrophilia
  - Leptospirosis
  - S. Moniliformis and Spirillium minor
- Viral Infections:
  - Rabies
  - Simian Herpes B Virus
  - Herpetic Whitlow & Hepatitis B

Bacterial Considerations

***Actinobacillus* species**
***Peptococcus* species**
***Propionibacterium* species**
***Bacteroides* species**
***Micrococcus* species**
Leptotrichia bacillus
Staphylococcus aureus
***Streptococcus* species**
***Bacillus* species**
***Corynebacterium* species**
***Eubacterium* species**
Pasteurella aerogenes
***Pseudomonas* species**
Eikenella corrodens
***Neisseria* species**
Clostridium perfringens

***Peptostreptococcus* species**
Veillonella parvula
Escherichia coli
***Moraxella* species**
Staphylococcus epidermidis
***Acinetobacter* species**
***Enterobacter* species**
Serratia marcescens
Proteus mirabilis
Aeromonas hydrophila
Pasteurella dagmatis, canis
Pasteurella multocida
Haemophilus aphrophilus
***Klebsiella* species**
Capnocytophaga canimorsus
***Bordetella* species**

Source	Pathogen
Alligator	Aeromonas Hydrophilia
Bear	Same as Dog
Cat	Afipia Felis (?Cat Scratch Disease?) *Rochalimaea* (bacillary angiomatosis) Cowpox
Big Cats	Pastuerella
Coyote	Francisella Tularensis
Human	Syphilis, TB, Herpes, Hepatitis B & C, HIV
Rodent:	Streptobacillus moniliformis, sprillium minus, Yersinia Pestis
Squirrel	Tularemia

Oral Pathogenic Bacteria

- Bite wounds are often polymicrobial
- Oral Anaerobes are important to remember
- Treat claw wounds identical to bite wounds as far as infections
- “Prophylactic antibiotics” is a misnomer, and it’s role has not been fully elucidated.

Pasteurella Multocida

- Most common pathogen of dog/cat bites
- Also seen with large cat and bear bites
  - Sensitive to PCN, Amoxicillin, 1st Gen CP
  - Much less sensitive to oxacillin, nafcillin
  - Clindamycin is NOT usually effective
  - Macrolides are not uniformly effective

Best Choice: Augmentin

Eikenella Corrodens

- Common with primate bite wounds
  - Resistant to first generation cephalosporins, macrolides, clindamycin, nafcillin.
  - Sensitive to Penicillin and 2nd/3rd generation cephalosporins, FQ
  - Acceptable Regimens include: Augmentin, cephalexin + PCN, dicloxacillin + PCN, FQ

Captocytophagia Camoris

- Old name: DF-2 (dysgonic fermemter-2)
- Gram Negative Bacillus
- Severe overwhelming sepsis with:
  - HIV
  - Asplenia
  - Immunosuppressive agents, including steroids
  - Alcoholic

Manage: Drug of Choice: High dose IV Penicillin.

Can also use: cephalosporins, clindamycin

Aeromonas Hydrophilia

Drug of Choice: TMP-sulfa

Also effective: aminoglycosides, imipenem, meropenem, +/- tetracycline

Leptospirosis

- Spirochetes: Dark Field Microscopy
- Incubation Period: 5-15 days but highly variable
- Two disease states:
  - Anicteric Leptospirosis: self-limited febrile illness
  - Weil's Disease: Liver Failure, renal failure, aseptic meningitis
    - Bimodal:
      - First phase with acute onset fever, headache, myalgias, conjunctivis, abdominal pain, nausea, vomiting, diarrhea
      - Diffuse Vasculitis onset 4 days- months

Therapy:

Supportive

PCN G or oral doxycycline

Rat Bite Fever

- S. moniliformis or Spirillum minus
- bite or scratch or the ingestion of contaminated food or water
- Incubation 2-10 days (1-20 days recorded)
- Symptoms:
  - irregularly relapsing fever
  - asymmetric polyarthritis
  - maculopapular rash on the extremities, palms, and soles
  - Headache, nausea, vomiting, myalgia, minimal regional lymphadenopathy, anemia, endocarditis, myocarditis, meningitis, pneumonia, and focal abscesses

Therapy: PCN

Rabies in Iraq

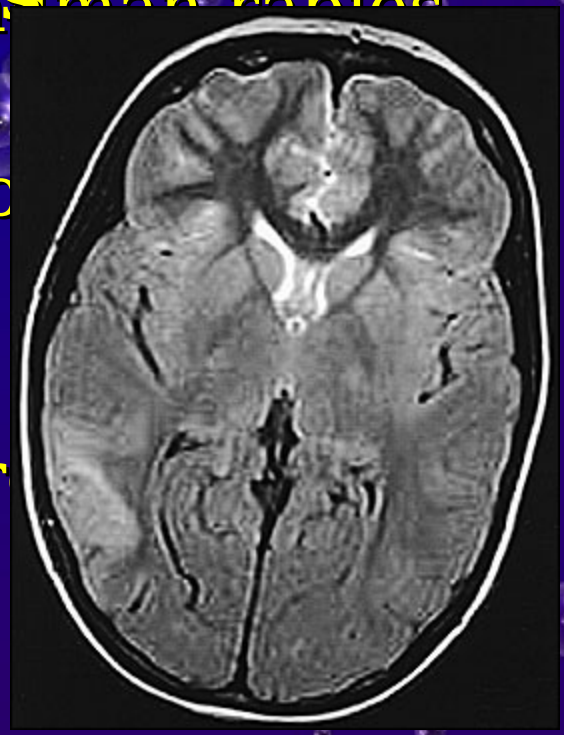
- No single foci in Iraq
- No seasonal distribution
- Most common source:
  - Dogs
  - Also wildlife and bats

- **2001:** 7 cases (0.03)
- **2000:** 14 cases (0.06)
- **1999:** 27 cases (0.11)
- **1998:** 14 cases (0.06)
- **1997:** 6 cases (0.03)
- **1996:** 23 cases (0.11)
- **1995:** 34 cases (0.17)
- **1994:** 32 cases (0.16)
- **1993:** 49 cases (0.25)
- **1992:** 84 cases (0.44)
- **1991:** 256 cases (1.31)
- **1990:** 37 cases (0.20)
- **1989:** 25 cases (0.14)

Rabies

- Genus Lyssavirus, Family Rhabdoviridae
- Negatively stranded RNA, bullet shaped
- 6 serotypes cause > 99% human rabies cases
- Initial infection in local mc
  hours
- Crosses motor end plates,
- CNS grey matter, then spr
  peripheral nerves

- **Symptoms:**
  - **Acute Encephalitis**
  - **Hydrophobia**
  - **Coma**
  - **Death**



Rabies

- Epidemiology:
  - **CDC (1996) for USA/Puerto Rico: 7124 Cases**
    - USA: Racoon is #1, Skunk is #2, Bats #3
    - **Racoons: 50.4%**
    - **Skunks: 23.2%**
    - **Bats: 10.4%**
    - **Others: Including rodents/lagomorphs: 1.2%**
  - World: Feral Dogs (90% human cases)
    - Rabies Free Zones:
      - Developing Countries: Dogs
      - Europe, Artic and North America: Foxes
      - Midwestern US and Canada: skunks
      - Caribbean: Mongoose
      - Europe/All Americas: Bats
    - Great Britain
    - Hawaii
    - Antarctica

Rabies

Domestic Livestock--variable

Storage:

- Rabies Vaccine:
  - 2-8C (36-46F), protect from light
- Rabies IG:
  - 2-8C
  - Do not use if frozen!

Bats

- In 1994, six rabies-associated deaths in USA
- Highest bat related rabies deaths since 1979
- Epidemiologic investigation failed to identify a clear history of animal bite exposure in any of these cases!

Bats

- Because some bat bites may be less severe—and therefore more difficult to recognize—than bites inflicted by larger animals, rabies postexposure prophylaxis should be considered for any physical contact with bats when bite or mucous membrane contact cannot be excluded
- MMWR April 14, 1995 / Vol. 44 / No. 14

Monkey Around!

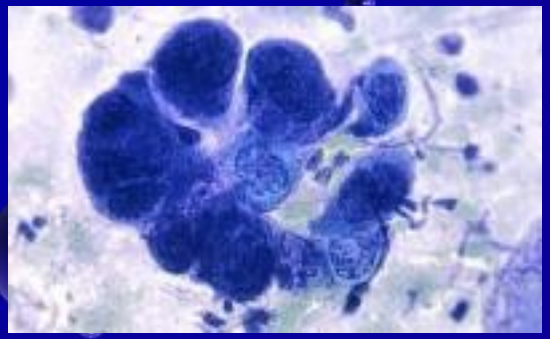
Simian Herpes B Virus

- alpha herpesvirus, enzootic in the rhesus (*Macaca mulatta*) and cynomolgus (*Macaca fascicularis*) members of the macaque genus, *Macaca*.

Simian Herpes B Virus

Cercopithecine herpes virus (CHV-1)

- enveloped herpesvirus (similar to HSV)
- Infects broad range of mammalian and avian species, including New World monkeys, Old World monkeys, and humans.
- Disease characterized by “Devastating” CNS infection
- 70% fatal, 100% severe morbidity

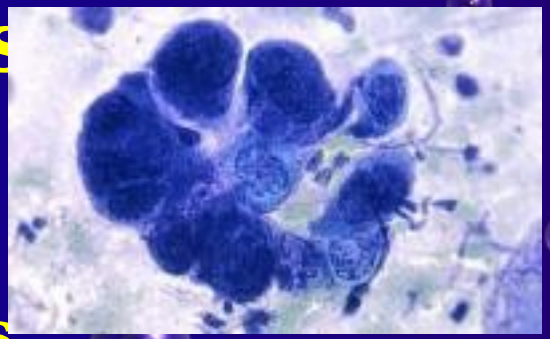


Simian Herpes B Virus

- **incubation period: 2-30 days**
- **progression of symptoms over 7-10 days**
- **Symptoms:**
  - **Early**
    - **Pain or pruritus at exposure site**
    - **Vesicles or ulcers at or near exposure site**
    - **Local lymphadenopathy**

Simian Herpes B Virus

- **Later Symptoms**
  - **Fever**
  - **Malaise**
  - **Diffuse myalgias**
  - **Headache**
  - **Numbness or paraesthesias at or near exposure site**
  - **Nausea and/or abdominal pain**
  - **Persistent hiccups**



Simian Herpes B Virus

- Late Symptoms:
  - Persistent headache
  - Alteration of mentation
  - Focal neurological complaints
- Findings include:
  - Meningismus
  - Confusion progressing to coma
  - Brain stem findings
  - Seizures
  - Ascending Paralysis

Simian Herpes B Virus

- Herpes B is a class 4 pathogen
- Therapy:
  - ?Acyclovir?, Valacyclovir?

Simian Herpes Virus

- The wound should be scrubbed with a soap solution for 20 minutes; eyes or mucous membranes should be irrigated with saline for at least 15 minutes.
- Immediate prophylaxis with acyclovir is generally not recommended. Cases of *H. simiae* infection are extremely rare, despite thousands of potential exposures each year. Furthermore, acyclovir may interfere with seroconversion, making diagnosis using the victim's acute and follow-up sera difficult.
- Acyclovir prophylaxis should be strongly considered for victims of high-risk exposures when the monkey is known to be actively shedding virus, particularly if the wound was not cleansed appropriately. Whether this should be done orally (800 mg five times a day) or intravenously (10 mg/kg every 8 hours) remains controversial.

Surgical Management

- Primary Closure is possible for some head/neck wounds
- Delayed Primary Closure gives equal aesthetic results
- Healing by Secondary Intention greatly increases scarring

Mammalian Bites

- Site Specific:
  Cosmetic or Functional
  - i.e.: Hand wound management focuses on functional repair
    - Flexor tendon sheaths & Joint Spaces
    - Extensor tendons—ROM
- Foreign body:
  - Cat Bites
  - Pig Bites

Questions?

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